2. Support for amendment

The above amendment incorporates limitations previously recited by claims 6, 25, 53, and 64 into the independent claims under consideration. A clean copy of the amended claims, with insertions and deletions indicated by underlining and brackets, respectively, is attached hereto as an Appendix. No new matter has been added by this amendment.

3. Claim rejections under 35 U.S.C. §103

In the Advisory Action dated December 24, 2002, the Examiner has maintained a rejection of claims 1-3, 5-7, 9-22, 24-26, 29-50, 52-72, and 74-78 as being unpatentable over Bansleben et al., U.S. Pat. No. 6,255,248 (hereinafter "Bansleben") in view of Cahill et al., U.S. Pat. No. 6,083,585 (hereinafter "Cahill"). Applicants respectfully traverse this rejection.

Bansleben is directed to compositions comprising (i) a copolymer of at least ethylene and a strained cyclic alkylene, (ii) a transition metal catalyst, and (iii) diluent polymers such as polyethylene terephthalate (PET) or polyvinylidene dichloride (PVDC), among others (col. 3, line 7-col. 4, line 19. The copolymer (i) may further comprise units having pendant cycloalkenyl moieties; an example of such a copolymer is ethylene/cyclopentene/4-vinylcyclohexene (Examples 19-28, Table 2, cols. 13-14). Bansleben also reported a comparative example of ethylene/4-vinylcyclohexene copolymer (Comparative Example 29, col. 13, lines 40-44). Bansleben did not report examples of blends of a polymer comprising 4-vinylcyclohexene units with PET, PVDC, or other oxygen barrier polymers recited in the present claims.

Cahill teaches an oxygen scavenging condensation copolymer comprising polyester segments and polyolefin oligomer segments, produced by condensation between the polyester segments and difunctionally derivatized polyolefin oligomer segments (e.g., diacid, diol, or

diamine) (col. 12, lines 17-63). The polyolefin oligomer segments are considered to be oxygen scavenging (col. 10, lines 10-45). Cahill does not discuss cycloalkenyl moieties as oxygen scavengers or blends comprising oxygen barrier polymers.

The references do not teach a blend of (i) an oxygen scavenging polymer selected from the group consisting of ethylene/methyl acrylate/cyclohexenylmethyl acrylate terpolymer (EMCM), ethylene/vinyl cyclohexene copolymer (EVCH), ethylene/cyclohexenylmethyl acrylate copolymer (ECHA), and cyclohexenylmethyl acrylate homopolymer (CHAA) and (ii) an oxygen barrier polymer. To the best of Applicants' knowledge, the closest teaching provided by the references is of a blend of (i) an ethylene/cyclopentene/vinyl cyclohexene terpolymer and (ii) what Bansleben refers to as a diluent polymer, such as PET or PVDC (col. 3, line 44-col. 4, line 19).

One of ordinary skill in the art would not have been motivated to modify the teachings of Bansleben to produce a blend of (i) EMCM, EVCH, ECHA, or CHAA and (ii) an oxygen barrier polymer, for several reasons. First, the oxygen scavenging polymers of Bansleben require units derived from strained cycloalkenes, such as cyclopentene. When cyclopentene undergoes vinylic polymerization, it forms a cyclopentane unit of the polymer, *i.e.*, an ethylenically saturated unit. In contrast, according to Bansleben, the inclusion in the polymer of units comprising an ethylenically unsaturated carbon-carbon double bond is merely optional. Thus, Bansleben teaches away from oxygen scavenging polymers containing only units comprising an ethylenically unsaturated carbon-carbon double bond as the scavenging moiety. EMCM, EVCH, ECHA, and CHAA are all oxygen scavenging polymers containing only units comprising an ethylenically unsaturated carbon-carbon double bond as the scavenging moiety.

Second, Bansleben's discussion of oxygen scavenging layers and oxygen barrier layers (col. 7, lines 23-40) as separate layers suggests the failure by those authors to envision blends of oxygen scavenging layers and oxygen barrier layers as being useful in packaging articles.

Third, Bansleben failed to recognize the advantage of reduced oxygen permeability possible for films formed from blends of (i) EMCM, EVCH, ECHA, and CHAA and (ii) an oxygen barrier polymer relative to films formed from oxygen barrier polymers alone. Bansleben provided no data reporting oxygen permeability of films formed from oxygen barrier polymers alone, let alone that of films formed from blends of oxygen scavenging polymers and oxygen barrier polymers.

One of ordinary skill in the art would have no basis to expect that films formed from such blends would have reduced oxygen permeability relative to films formed from oxygen barrier polymers alone. A film formed from an oxygen barrier polymer has a low oxygen permeability (rate of oxygen flow through the film) because of the microstructure formed by barrier polymer molecules in the film. Removing barrier polymer molecules, all other things being equal, would be expected to increase the permeability. Because most oxygen scavenging polymers have a relatively low scavenging rate (e.g., Bansleben, Tables 3-5), one of ordinary skill in the art would consider it likely that replacing some of the barrier polymer molecules in a film with oxygen scavenging polymer molecules would lead to higher oxygen permeability, with the scavenging polymers being most active in scavenging oxygen <u>after</u> the oxygen had infiltrated the film and entered the package interior.

Applicants tested this hypothesis, Example 2 and Table 2, pp. 22-23. Surprisingly, a film formed from 80 wt% ethylene/vinyl alcohol (EVOH), 18 wt% EMCM, and 2 wt% cobalt masterbatch with ethylene/methyl acrylate (EMAC) carrier resin (Sample 4) had an oxygen

permeability of substantially zero, whereas a film formed from 100 wt% EVOH exhibited oxygen permeability of 4.64 cc/m^2-day. This surprising result would not have been expected in light of Bansleben and Cahill, for the reasons discussed above. Therefore, Applicants believe the references do not suggest the claimed invention, and the rejection of claims 1-3, 5-7, 9-22, 24-26, 29-50, 52-72, and 74-78 should be withdrawn.

4. Closing remarks

Upon approval of the request for continued examination filed herewith, and entry of this amendment, Applicants believe all pending claims under consideration, *viz.*, claims 1-3, 5-7, 9-22, 24-26, 29-50, 52-72, and 74-78, are in condition for allowance. The Examiner is invited to contact the undersigned patent agent by telephone at (713) 934-4065 with any questions, comments or suggestions relating to the referenced patent application.

Respectfully submitted,

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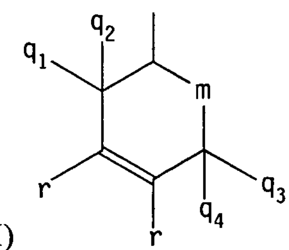
APPENDIX

Amended Claims

1. (Twice Amended) An oxygen barrier composition, comprising:

an oxygen barrier polymer, an oxygen scavenging polymer, and an oxidation catalyst,

wherein the oxygen scavenging polymer [comprises a cycloalkenyl group having the structure I:



(I)

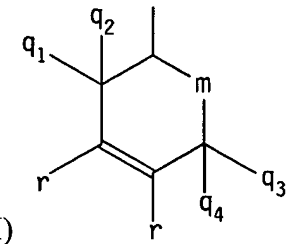
wherein q_1, q_2, q_3, q_4, and r are independently selected from hydrogen, methyl, or ethyl; m is $-(CH_2)_n-$, wherein n is an integer from 0 to 4, inclusive; and, when r is hydrogen, at least one of q_1, q_2, q_3, and q_4 is also hydrogen] is selected from the group consisting of ethylene/methyl acrylate/cyclohexenylmethyl acrylate terpolymer (EMCM), ethylene/vinyl cyclohexene copolymer (EVCH), ethylene/cyclohexenylmethyl acrylate copolymer (ECHA), and cyclohexenylmethyl acrylate homopolymer (CHAA).

6. (Cancelled)

20. (Twice Amended) A packaging article, comprising:

at least one oxygen barrier layer comprising an oxygen barrier polymer and an oxygen scavenging polymer,

wherein the oxygen scavenging polymer [comprises a cycloalkenyl group having the structure I:



(I)

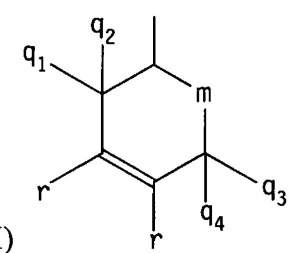
wherein q_1, q_2, q_3, q_4, and r are independently selected from hydrogen, methyl, or ethyl; m is $-(CH_2)_n-$, wherein n is an integer from 0 to 4, inclusive; and, when r is hydrogen, at least one of q_1, q_2, q_3, and q_4 is also hydrogen] is selected from the group consisting of ethylene/methyl acrylate/cyclohexenylmethyl acrylate terpolymer (EMCM), ethylene/vinyl cyclohexene copolymer (EVCH), ethylene/cyclohexenylmethyl acrylate copolymer (ECHA), and cyclohexenylmethyl acrylate homopolymer (CHAA).

25. (Cancelled)

49. (Twice Amended) A method of making an oxygen barrier composition comprising an oxygen barrier polymer and an oxygen scavenging polymer, comprising:

providing the oxygen barrier polymer and the oxygen scavenging polymer; and

blending the oxygen barrier polymer and the oxygen scavenging polymer to form the oxygen barrier composition, wherein the oxygen scavenging polymer [comprises an ethylenic backbone and a cycloalkenyl group having the structure I:



(I)

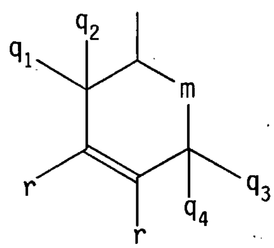
wherein q_1, q_2, q_3, q_4, and r are independently selected from hydrogen, methyl, or ethyl; m is $-(CH_2)_n-$, wherein n is an integer from 0 to 4, inclusive; and, when r is hydrogen, at least one of q_1, q_2, q_3, and q_4 is also hydrogen] is selected from ethylene/methyl acrylate/cyclohexenylmethyl acrylate terpolymer (EMCM),

ethylene/vinyl cyclohexene copolymer (EVCH), ethylene/cyclohexenylmethyl acrylate copolymer (ECHA), and cyclohexenylmethyl acrylate homopolymer (CHAA).

53. (Cancelled)

59. (Twice Amended) A method of making an oxygen barrier composition comprising an oxygen barrier polymer and an oxygen scavenging polymer, wherein the oxygen scavenging polymer is present as an insoluble filler, comprising:

providing the oxygen barrier polymer and the oxygen scavenging polymer, wherein the oxygen scavenging polymer [comprises a cycloalkenyl group having the structure I:

(I) 

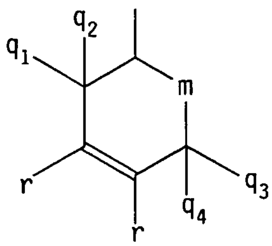
wherein q_1, q_2, q_3, q_4, and r are independently selected from hydrogen, methyl, or ethyl; m is $-(CH_2)_n-$, wherein n is an integer from 0 to 4, inclusive; and, when r is hydrogen, at least one of q_1, q_2, q_3, and q_4 is also hydrogen] is selected from the group consisting of ethylene/methyl acrylate/cyclohexenylmethyl acrylate terpolymer (EMCM), ethylene/vinyl cyclohexene copolymer (EVCH), ethylene/cyclohexenylmethyl acrylate copolymer (ECHA), and cyclohexenylmethyl acrylate homopolymer (CHAA);

cross-linking the oxygen scavenging polymer with itself, to form an insoluble oxygen scavenging polymer; and

mixing the oxygen barrier polymer and the insoluble oxygen scavenging polymer, to form the oxygen barrier composition.

60. (Twice Amended) A method of forming an oxygen barrier layer in a packaging article, comprising:

providing an oxygen barrier composition comprising an oxygen barrier polymer and an oxygen scavenging polymer, wherein the oxygen scavenging polymer [comprises a cycloalkenyl group having the structure I:



(I)

wherein q_1, q_2, q_3, q_4, and r are independently selected from hydrogen, methyl, or ethyl; m is $-(CH_2)_n-$, wherein n is an integer from 0 to 4, inclusive; and, when r is hydrogen, at least one of q_1, q_2, q_3, and q_4 is also hydrogen] is selected from the group consisting of ethylene/methyl acrylate/cyclohexenylmethyl acrylate terpolymer (EMCM), ethylene/vinyl cyclohexene copolymer (EVCH), ethylene/cyclohexenylmethyl acrylate copolymer (ECHA), and cyclohexenylmethyl acrylate homopolymer (CHAA); and

forming the composition into the packaging article or an oxygen barrier layer thereof.

64. (Cancelled)